WHAT IS CLAIMED IS:

1. An in vitro method of assaying for a modulator of GADD45 polypeptide activity, wherein the method comprises combining a GADD45 polypeptide with a test compound in an aqueous solution and assaying whether the test compound can inhibit or decrease GADD45 polypeptide binding specifically to a Cdc2 polypeptide.

2. An in vitro method of assaying for a modulator of GADD45 polypeptide activity, wherein the method comprises combining a GADD45 polypeptide with a test compound in an aqueous solution and assaying whether the test compound can inhibit or decrease GADD45 polypeptide-mediated dissociation of a Cdc2/Cyclin B1 protein complex.

3. An in vitro method of assaying for a modulator of GADD45 polypeptide activity, wherein the method comprises combining a GADD45 polypeptide with a test compound in an aqueous solution and assaying whether the test compound can inhibit or decrease GADD45 polypeptide inhibition of Cdc2/Cyclin B1 complex kinase activity.

4. The method of claim 3, wherein the Cdc2/Cyclin B1 complex kinase activity is phosphorylation of histone H1.

5. An in vitro method of assaying for a compound capable of specifically binding to a GADD45 polypeptide, wherein the method comprises combining a GADD45 polypeptide with a test compound in an aqueous solution and assaying whether the test compound specifically binds to the GADD45 polypeptide;

wherein the GADD45 polypeptide has a sequence as set forth by amino acid residues 61 to 87 of SEQ ID NO:2.

6. An in vivo method of assaying for a modulator of GADD45 polypeptide activity, wherein the method comprises combining a cell expressing a GADD45 polypeptide with a test compound in an aqueous solution and assaying whether the test compound can inhibit or decrease GADD45 polypeptide binding specifically to a Cdc2 polypeptide.

7. The method of claim 6, wherein the cell is a proliferating cell.

8. The method of claim 7, wherein the cell is a cancer cell.

9. An in vivo method of assaying for a modulator of GADD45 polypeptide activity, wherein the method comprises combining a cell expressing a GADD45 polypeptide with a test compound in an aqueous solution and assaying whether the test compound can inhibit or decrease GADD45 polypeptide-mediated dissociation of a Cdc2/Cyclin B1 protein complex.

10. The method of claim 9, wherein the cell is a proliferating cell.

11. The method of claim 11, wherein the cell is a cancer cell.

12. A method for sensitizing a proliferating cell to a DNA base-damaging agent by inhibiting GADD45 polypeptide activity comprising administering a composition capable of specifically binding to the GADD45 polypeptide in an amount sufficient to inhibit or decrease GADD45 polypeptide specific binding to the Cdc2 polypeptide.

13. The method of claim 12, wherein the composition is an antibody specifically reactive with the GADD45 polypeptide.

14. The method of claim 13, wherein the antibody is specifically reactive with a domain of the GADD45 polypeptide comprising a sequence set forth by amino acid residues 61 to 84 of SEQ ID NO:2.

15. The method of claim 12, wherein the proliferating cell is a cancer cell.

16. The method of claim 15, wherein the DNA base-damaging agent is UV radiation.

17. The method of claim 12, wherein the DNA base-damaging agent is a chemotherapeutic agent.

18. The method of claim 17, wherein the chemotherapeutic agent is a base-damaging alkylating agent.

19. An isolated polypeptide consisting essentially of an amino acid sequence selected from a group of sequences from a wild type GADD45 (SEQ ID NO:2 having a DEDDDR subsequence having amino and carboxy ends, wherein the amino acids of the sequences are in their native order, are linear peptides, and further consist of the DEDDDR subsequence or of DEDDDR and of about 20 or fewer amino acids of SEQ ID NO:2 which naturally flank the DEDDDR subsequence at either or both the amino and carboxy ends, and are in their native order, and wherein said polypeptide inhibits GADD45 activity by at least 10%.

20. An isolated polypeptide of claim 19, comprising about 10 or fewer amino acids of SEQ ID NO:2 which naturally flank the DEDDDR subsequence at either or both the amino and carboxy ends.

21. An isolated polypeptide of claim 19, comprising DEDDDR.

22. An isolated polypeptide with at least 95% sequence identity to a polypeptide of claim 19, and which inhibits GADD45 activity by at least 10%.

23. A composition comprising an isolated polypeptide of claim 19 in a pharmaceutically acceptable carrier.

24. A composition comprising an isolated polypeptide of claim 22 in a pharmaceutically acceptable carrier.

25. A system comprising a liposome comprising an isolated polypeptide of claim 19.

26. A system comprising a liposome comprising an isolated polypeptide of claim 22.

27. A nucleic acid encoding an isolated polypeptide of claim 19.

28. A nucleic acid encoding an isolated polypeptide of claim 22.

29. A method for sensitizing a proliferating cell to a DNA base-damaging agent by inhibiting GADD45 polypeptide activity comprising administering a polypeptide of claim 19.

30. A method for sensitizing a proliferating cell to a DNA base-damaging agent by inhibiting GADD45 polypeptide activity comprising administering a polypeptide of claim 22.

31. A method for sensitizing a proliferating cell to a DNA base-damaging agent by inhibiting GADD45 polypeptide activity comprising administering a an antibody which specifically binds to the GADD45 polypeptide, wherein said binding inhibits or decreases GADD45 polypeptide activity by at least 10%.

32. The method of claim 31, wherein the antibody is specifically reactive with a domain of the GADD45 polypeptide comprising a sequence set forth by amino acid residues 61 to 87 of SEQ ID NO:2.

33. The method of claim 32,wherein the antibody specifically binds to an epitope comprising some or all of an amino acid sequence DEDDDR.

34. The method of claim 31, wherein the proliferating cell is a cancer cell.

35. The method of claim 31, wherein the DNA base-damaging agent is UV radiation.

36. The method of claim 31, wherein the DNA base-damaging agent is a chemotherapeutic agent.

37. The method of claim 36, wherein the chemotherapeutic agent is a base-damaging alkylating agent.